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SUMMARY

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THE STUDY OF ERUPTIVE ROCK (TUFF) AS A SUBSTITUTE OF REFRACTORIES TO A TEMPERATURE OF 1,600°C

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The Study of Eruptive Rock (Tuff) as a Substitute of Refractories to a Temperature of I,600°C

by

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Refractories used for the construction of various industrial furnaces, fire-boxes and apparatus operating at high temperatures of over I,000° are manufactured at special plants from various raw materials (fire-clays, quartzites, etc.). In many countries refractories are expensive and scarce. The investigations carried out in the USSR have shown that volcanic rock (tuff) which till now has been used only as a building material (Armenia in the USSR, Italy) can be effectively used as a substitute of refractories. Tuff-lava forms during especially intensive eruptions of highly explosive magma rich in silicic acid and gas which usually occur after the volcano has benn dormant for a long time. The Artik tuff-lava (from Armenia), we have studied, had a weight by volume of 0.9 to I.2 kg/m^3, mechanical strength in compression up to I20-I30 kg/cm^2 and could easily withstand drastic temperature variations (heating up to I,I40°) and cooling in a stream of cold running water. Since volcanic tuff-lava can be easily sawed up, blocks of all sizes and shapes can be obtained from it. This is very important because industrial furnaces can be constructed with a minimum number of seams.

The advantages inherent in the planned system of the USSR national economy helped towards a successful utilisation of volcanic tuff-lava as a cheap and valuable substitute of refractories. In thevicinity of the city of Moscow several brick kilns used large-size blocks made of tuff-lava (insteas of fire-clay refractories) for laying the walls and cupolas of ring kilns.

The operation of these kilns over a long time confirmed the technical and economic effectiveness of applying volcanic rock (tuff) as substitutes of refractories. In view of the abundant reserves of volcanic tuffs in many countries we deem it advisable that measures be taken to carry out scientific research into this most urgent problem using the methods developed in the USSR.

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